

-10-

What is claimed is:

1. A cleaning apparatus for use in a fluid treatment system comprising a radiation source assembly, the cleaning apparatus comprising:
 - at least one cleaning sleeve in sliding engagement with the exterior of the radiation source assembly;
 - a first chamber disposed in the at least one cleaning sleeve in contact with a portion of the exterior of the radiation source assembly and for being supplied with a cleaning solution;
 - a second chamber disposed in the at least one cleaning sleeve adjacent the first chamber;
 - seal means to restrict movement of fluid between the first chamber and the second chamber; and
 - drive means to translate the at least one cleaning sleeve along the exterior of the radiation source assembly.
2. The cleaning apparatus defined in claim 1, further comprising first drain means to withdraw fluid from the second chamber.
3. The cleaning apparatus defined in claims 1-2, further comprising second drain means to withdraw cleaning fluid from the first chamber.
4. The cleaning apparatus defined in claims 1-3, further comprising supply means to supply cleaning fluid to the first chamber.
5. The cleaning apparatus defined in claims 1-4, wherein the first chamber comprises a first annular chamber substantially surrounding the exterior of the radiation source assembly.
6. The cleaning apparatus defined in claims 1-5, wherein the second chamber comprises a pair of second annular chambers on opposed sides of the first chamber and substantially surrounding the exterior of the radiation source

09744682.062601

assembly.

7. The cleaning apparatus defined in claims 1-6, wherein the pair of second annular chambers are in communication with one another.
8. The cleaning apparatus defined in claims 1-7, wherein the seal means defines a barrier between the first chamber and the second chamber.
9. The cleaning apparatus defined in claims 1-8, further comprising second seal means disposed between the at least one cleaning sleeve and the exterior of the radiation source assembly.
10. The cleaning apparatus defined in claims 1-9, wherein the radiation source assembly comprises at least one radiation source disposed in a protective sleeve.
11. The cleaning apparatus defined in claims 1-10, wherein the protective sleeve comprises a quartz sleeve.
12. A fluid treatment device comprising a housing for receiving a flow of fluid, the housing comprising:
 - a fluid inlet;
 - a fluid outlet;
 - a fluid treatment zone disposed between the fluid inlet and the fluid outlet;
 - a radiation source assembly disposed in the fluid treatment zone for treatment of the flow of fluid; and
 - a cleaning apparatus comprising: at least one cleaning sleeve in sliding engagement with the exterior of the radiation source assembly; a first chamber disposed in the at least one cleaning sleeve in contact with a portion of the exterior of the radiation source assembly and for being supplied with a cleaning solution; a second chamber disposed in the at least one cleaning sleeve adjacent the first chamber; seal means to prevent substantially unrestricted movement of fluid between the first chamber and the second chamber; first drain means to

09744582-062601
FO9290-2894450

withdraw fluid from the second chamber: and drive means to translate the at least one cleaning sleeve along the exterior of the radiation source assembly.

14. The fluid treatment device defined in claims 12-13, wherein the cleaning apparatus further comprises second drain means to withdraw cleaning fluid from the first chamber.

16. The fluid treatment device defined in claims 12-15, wherein the first chamber comprises a first annular chamber substantially surrounding the exterior of the radiation source assembly.

18. The fluid treatment device defined in claims 12-17, wherein the pair of second annular chambers are in communication with one another.

20. The fluid treatment device defined in claims 12-19, wherein the cleaning

-13-

apparatus further comprises second seal means disposed between the at least one cleaning sleeve and the exterior of the radiation source assembly.

21. The fluid treatment device defined in claims 12-20, wherein the protective sleeve comprises a quartz sleeve.

22. The fluid treatment device defined in claims 12-21, wherein the fluid treatment zone comprises a substantially elongate irradiation zone.

23. The fluid treatment device defined in claims 12-22, wherein the radiation source assembly comprises at least one radiation source disposed in a protective sleeve.

24. The fluid treatment device defined in claims 12-23, wherein the at least one radiation source is substantially elongate.

25. The fluid treatment device defined in claims 12-24, wherein the at least one radiation source is disposed substantially parallel to a flow of fluid through the irradiation zone.

26. The fluid treatment device defined in claims 12-25, wherein the at least one radiation source is disposed substantially transverse to a flow of fluid through the irradiation zone.

27. The fluid treatment device defined in claims 12-26, wherein the fluid inlet, the fluid outlet and the fluid treatment zone are arranged in a substantially collinear manner.

28. The fluid treatment device defined in claims 12-27, wherein the fluid inlet, the fluid outlet and the fluid treatment zone have substantially the same cross-section.

FO9230*28944260

-14-

29. The fluid treatment device defined in claims 12-28, wherein the fluid inlet, the fluid outlet and the fluid treatment zone are arranged in a substantially non-collinear manner.

102230 239460